PATENT SPECIFICATION

DRAWINGS ATTACHED

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COMPLETE SPECIFICATION

Catamenial Tampon

We, TAMPAX INCORPORATED, a Corporation of the State of Delaware, United States of America, whose business address is Palmer, Massachusetts, United States of America, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to catamenial tampons and has for its object to provide an absorbent tampon having a moisture resistant barrier at the lower or outer end thereof (when considered as in position in use) for retarding flow of menstrual fluid through or out of the tampon sufficiently for substantially complete absorption thereof by the absorbent medium in the tampon.

Considering as illustrative catamenial tampons for insertion into the human vagina for absorption of menstrual flow therein, it is to be noted that the tampons are formed of a compressed mass of absorbent fibers which is inserted into the vagina and retained therein by the vaginal sphincter in such position as to absorb the menstrual flow in the mass of fibers. As is well known, the volume and rate of menstrual flow vary over wide ranges not only from time to time within the menstrual period but also greatly from person to person. Thus, the situation may arise, where, during a period when the menstrual flow is particularly heavy and/or, perhaps, at a time when the tampon has already absorbed a substantial proportion of its capacity of menstrual fluid, some small amount of the fluid may actually pass all the way through the tampon before it can be absorbed and retained therein. Since even a tiny amount of menstrual fluid emerging from the vagina is undesirable and, perhaps, embarrassing, it may be desired to assure against this situation no matter how infrequently it may be expected to happen.

According to this invention, a catamenial tampon of the character described is provided with a moisture resistant barrier at the lower or outer end thereof for the purpose of retarding flow out of the tampon sufficiently so that any fluid attempting so to flow out will be retained mechanically for a sufficient time for the fluid to be absorbed in the absorbent mass of the tampon fibres, but not sufficiently so "dam" or undesirably prevent continued and natural menstrual flow.

The present invention consists in absorbent catamenial tampon of the character described which comprises a generally cylindrical compressed mass of absorbent fibres to absorb catamenial flow, a moisture resistant barrier at or over the lower or outer end only thereof to retard the outward flow of fluid from the absorbent fibres, and a cord for withdrawing the tampon from the vagina after use.

In order that the invention may be more clearly understood, reference will now be made to the accompanying drawing, in which:—

Fig. 1 is a perspective view of a tampon embodying this invention as manufactured and prior to insertion, with part of the applicator tube in which the tampon is sold broken away;

Fig. 2 is a vertical median section through a human vagina and adjacent organs showing a tampon embodying this invention in position for use;

Fig. 3 is a view of a tampon embodying this invention and expanded (as after having been ejected from the applicator tube of Fig. 1 and in position as in Fig. 2) for increased absorption as when in use;

Fig. 4 is a perspective view, somewhat diagrammatic, of a partly manufactured tampon prior to compression of the tampon and its mass of absorbent fibres into a generally cylindrical mass, and illustrating one means of affixing a moisture resistant barrier according to this invention;

Fig. 5 is a fragmentary view, somewhat diagrammatic, of an embodiment for practicing

this invention in which the moisture proof barrier at the bottom of a cotton bat is provided for enclosing an additional area of the bat than in the embodiment illustrated in Fig. 4;

Fig. 6 is a fragmentary view, somewhat diagrammatic, and in perspective as Fig. 5, illustrating a situation where the moisture proof barrier is folded around and over the edge portions of the original tampon bat prior to compression thereof; and

Fig. 7 is a further fragmentary and somewhat diagrammatic illustration in perspective of a further embodiment of the application of a moisture proof or retarding barrier according to this invention.

Referring to the drawing, in which like reference characters designate like parts throughout the several views thereof, a catamenial tampon, generally such as those to which this invention relates, is illustrated in Fig. 1 as comprising a compressed mass of absorbent cotton fibres 10 compressed into a generally cylindrical form and partially enclosed within a cylindrical tube 11 to aid in the insertion of the tampon into the vagina. A telescoping cooperating tube 12 is also provided for ejecting the tampon 10 from the tube 11 after the insertion thereof into the vagina, and a cord or string 13 is shown as affixed to the tampon 10 to aid in the removal thereof from the vagina after use. Such a tampon is well known in this art, and both it and methods of its manufacture are well understood.

As indicated in Fig. 2, insertion of the tampon is accomplished by inserting the tip of the outer tube 11 into the vaginal opening and past the vaginal sphincter 20, and then ejecting the tampon 10 from tube 11 by depressing telescoping tube 12 so that the tampon, after insertion, assumes generally the position indicated in Fig. 2 substantially filling the vagina 21 and in a position with respect to the uterus 22 to receive and absorb catamenial fluid flowing into the vagina 21. Although tampons are selected as to size and manufactured to accommodate wide variations in quantity and rate of menstrual flow, there may occur an excessively copious surge or a situation where the tampon is almost completely full of absorbed fluid or some sudden unusual exercise on the part of the wearer whereby menstrual fluid flows into the tampon at so great a rate that it will not momentarily be retained by the absorbent fibre mass and a small portion thereof may actually emerge through the lower or outer end of the tampon (the right hand end in Fig. 2) through or to the vaginal sphincter 20.

To assure against this situation a moisture resistant barrier is provided according to this invention and generally indicated in Fig. 2 as 25 at the outer or lower end of the tampon to retain outward flow of fluid at least temporarily and until such outflowing fluid can be absorbed and retained by the absorbent fibres in the tampon. Such a moisture resistant barrier is indicated in Fig. 3 as comprising a cup-shaped covering 30 provided over the lower end of the tampon and treated to be substantially resistant or impervious to body fluid. The cup 30 is so dimensioned that it will not substantially constrain the full expansion of the compressed tampon from its compressed form indicated in the applicator tube 11 of Fig. 1 to its expanded position indicated in Fig. 2 in place in the vagina, although, as will be noted from Fig. 2, cup 30 is at an end of the tampon 10 which, because of the natural shape of the vagina 21, need not, perhaps, expand to such a full extent as other portions of the tampon. Such an arrangement provides for the moisture resistant barrier of cup 30 at least retarding outward flow of fluid from the lower end of the tampon sufficiently for any free flowing fluid retained by cup 30 to be absorbed or re-absorbed by the normal absorbing, capillary, etc., action of the mass of absorbent fibres.

It should be noted that the cup or barrier 30 preferably is configured, in the finished tampon, as in Fig. 3 to cover not only the bottom end of the tampon but also to extend a portion of the way along the sides thereof (for example from three quarters of an inch to one inch), but note that Fig. 3 shows a tampon after compression in the generally cylindrical dies as used in the manufacture of tampons of this character. As so compressed, the moisture resistant covering 30 of sheet material provides a covering over the base or lower or external end of the tampon 10 and is affixed thereto by being adhered to the end of the compressed mass of fibres and/or by being affixed to the withdrawal cord 13.

One satisfactory method of manufacturing an absorbent cotton catamenial tampon according to this invention is to take a generally rectangular bat 40 of absorbent cotton (about one quarter inch or less in thickness and about one and three-quarters inches wide and four inches long) and sew withdrawal cord 13 along the centre thereof. Thereafter bat 40 is compressed into its desired cylindrical shape in cylindrical molds or otherwise, as well understood in this art.

As indicated in Fig. 4, the bat 40 has withdrawal cord 13 sewn down the centre thereof as by stitches 41, the ends of the stitched threads projecting beyond the bat to form the withdrawal cord 13. Prior to the sewing operation, a piece of moisture resistant fabric or other sheet material 42 is folded over one end of bat 40, and affixed thereto during the sewing operations, the stitches 41 uniting the withdrawal cord 13 with both the bat 40 and the fabric 42. Thereafter, the entire partially finished tampon (illustrated in Fig. 4), in-

cluding the fabric barrier 42, is subjected to the usual molding or forming or compressing operations to form the compressed cylindrical tampon 10 for insertion, as in Fig. 1, into applicator tube 11. During this molding or forming operation, as will be understood, the open side edges 43 of the fabric covering 42 will be brought together, overlapped, and folded together to provide in the finished compressed tampon a moisture resistant cup 30 as indicated in Fig. 3. It may be desired, of course, actually to seal or affix together the open side edges 43 of fabric covering 42, although satisfactory results are obtained upon compressing and molding the partially completed tampons shown in Fig. 4 without, necessarily, providing a specific adhesive or other closure or seam for the edge portions 43.

Satisfactory results are also obtained by providing, as the moisture resistant barrier 25, a sheet material of moisture resistant paper, synthetic resin plastic, or fabric, as indicated in Fig. 5 at 45 to be applied over the base or lower end of the bat 40 from which the tampon is to be formed or compressed and to be affixed thereto, as in the illustration of Fig. 4, by stitches 41, which are also utilized to unite the bat 40 and withdrawal string 13. As will be noted in the embodiment illustrated in Fig. 5, the edges 46 of the moisture resistant sheet material 45 extend substantially beyond the lateral edges of absorbent cotton bat 40 so that, as more particularly illustrated in Fig. 6, these extending edges 46 can be folded back on or around the bat 40 to form a rectangular package prior to compression or forming of the bat into a cylindrical tampon (for example, as illustrated in Fig. 3) in the usual cylindrical compression dies.

In further ways of providing the moisture resistant barrier the outer or lower end of the tampon may be sprayed with or dipped in a moisture resistant material, such as a synthetic resin, and/or by spraying or dipping the sheet material 45 with or in a moisture resistant composition, either before or after formation thereof on to the bat 40 or on a cylindrical tampon 10, to enhance the moisture barrier effects thereof.

As illustrative of moisture resistant sheet materials with which satisfactory results have been obtained may be mentioned paper or synthetic resin plastic sheets or woven or non-woven fabrics (by which terms should be understood braided, knitted, felted, etc., fabrics) inherently resistant to or treated to be resistant to body fluids by any one of a number of well known methods. For example, there are noted well known, substantially moisture impervious or retardant sheet materials, such as impregnated gauze, other impregnated or not impregnated woven cloths of various natural and synthetic fibres, wet-strength papers and related felted cellulosic products, and this invention also contemplates the direct application (on either the absorbent cotton fibres themselves in bat 40 or tampon 10 or on a gauze or other fabric or webbing or sheet material covering 42) of any one of a number of various moisture-resistant materials. For example, an alcohol-ether solution of cellulose nitrate can readily, in known manner, be applied on either the lower or outer end of the tampon to form the desired moisture resistant barrier and/or on a gauze covering 42 or 45 which may be preliminarily formed (as at 30 in Fig. 3 to provide the desired cup effect) and thereafter rendered sufficiently moisture resistant to provide the retarding barrier. Similarly, ethyl cellulose dissolved in chlorinated hydrocarbons, in known manner, may provide a similar moisture conditioning material, in addition to those moisture resistant sheet or fabric materials well known in this art. Also vinyl acetate resins dissolved in chlorinated hydrocarbons, silicone substances in various aqueous emulsions, etc., are suitable and produce satisfactory results within a range of, approximately, 1%—5% concentration as applied to the particular sheet material or tampon involved.

An alternative construction is illustrated, diagrammatically, in Fig. 7, in which the usual rectangular bat 40 of absorbent material is provided (of course, prior to compression thereof into a cylindrical form as in Fig. 3) around the lower or outer edge thereof with a moisture resistant barrier or sheet material layer 42 united with absorbent cotton bat 40 by, as in the previous illustrations, stitching 41, which also unites the entire assembly with a withdrawal string 13. Whether or not the side edges 43 of the moisture resistant fabric or sheet material 42 do or do not extend beyond the transverse dimension of bat 40 (as in Fig. 4 or, alternatively, as in the construction indicated in Figs. 5 and 6), the barrier or sheet material 42 is applied to bat 40 to form the moisture resistant cup 25 as previously described.

Since the bat of absorbent cotton or absorbent cotton wool 40 is made up of a plurality of substantially distinct layers united by the stitching 41, some advantage may be gained by applying a further thin layer 50 of absorbent cotton over the outside of sheet material 42, said extra layer 50 (which, as will be understood, is applied to both sides of bat 40) may be stitched thereto and integrated therewith by the same stitching 41. In this case, and as illustrated in Fig. 7, such an arrangement, after being compressed in the usual cylindrical compression die into a generally cylindrical tampon as in Fig. 3, will provide the merits of the moisture retarding barrier according to this invention without having the existence of this barrier immedi-

ately apparent to an observer of the finished tampon.

The ultimate efficiency and utility of a commercially acceptable tampon has to do primarily with the fact that the user is interested primarily in complete protection from any outward show or inconvenience resulting from the inevitable menstrual cycle. If this complete freedom can be obtained, the user of the tampon will accept it as an article of utility; if the tampon fails to provide the desired amount of protection, the user will be dissatisfied. It is also known that "damming" of the menstrual flow is psychologically and physiologically disadvantageous. Accordingly, and particularly with regard to the construction illustrated in Fig. 7, substantial commercial and psychological advantage may be gained if the user of the tampon is not aware (because of the overlying layer 50 of absorbent cotton fibres hiding the moisture proof barrier sheet material 42) that a moisture proof barrier exists, for the reason, among others, that, if the tampon visually appeared to the user (who is, of course, unskilled in the art of tampon manufacture and, inevitably, uninterested in the technology thereof), the user might confuse in her mind the existence of a moisture proof barrier with an undesired physiological, damming effect—which effect, as previously noted, is not produced by tampons according to and embodying this invention.

In any case, however, it should be noted that the provision of moisture proof barrier 25, whether as a cup enclosing a substantial portion of the lower end of the tampon or otherwise, results primarily in a moisture resistant reservoir area at the base or lower or outer end of the tampon to retain body fluid at least temporarily until it can be absorbed in the usual and normal manner by the absorbent fibres of the tampon. Such barrier is not meant to restrain in any way the expansion characteristics of the tampon in use nor is it meant to constrain the inherent resiliency of the fibres (as would be the case with a tight fitting covering), nor the normal flow of menstrual fluid. In addition, as will be understood, the particular material from which the moisture proof barrier 25 is made and/or the particular material or treatment utilized to render barrier 25 adequately moisture resistant are all selected so as to be physiologically inert and non-irritating when in use as well as to be in no way inimical to the normal physiological, bacteriological, etc., environment of the human vagina and the tissues thereof with which they will be in contact.

As will be seen from the foregoing, an improved tampon is provided by this invention whereby, without otherwise substantially affecting the size, degree of compression, or capacity for absorption and fluid retention of the compressed absorbent fibres, a moisture resistant area or reservoir is formed at the outer or lower end of the tampon to retard or retain (at least temporarily) outward flow of fluid, whether arising from a sudden surge in menstrual flow or from other causes such as expulsion of already absorbed fluid by sudden muscular activity of the user, so that such excess or unabsorbed or expulsed fluid is retarded from flowing out of the tampon sufficiently for the unabsorbed fluid to be absorbed or reabsorbed in the usual way by the absorbent mass of compressed fibres as desired.

While the methods and products described herein constitute preferred embodiments of the invention, it is to be understood that the invention is not limited to these precise methods and products and that changes may be made therein without departing from the scope of the invention as defined in the accompanying claims.

WHAT WE CLAIM IS:—

1. A catamenial tampon for insertion into the human vagina which comprises a generally cylindrical compressed mass of absorbent fibres for absorbing and retaining body fluid in said vagina, a moisture-resistant barrier at or over the outer and lower end only of said tampon when in position in said vagina for retarding outward flow of body fluid from said tampon, and a cord for withdrawing said tampon from said vagina after use.

2. A catamenial tampon as claimed in Claim 1, wherein the moisture-resistant barrier encloses said outer and lower end of the tampon.

3. A catamenial tampon as claimed in Claim 1 or 2, wherein the moisture-resistant barrier is affixed to the cord.

4. A catamenial tampon as claimed in Claim 1, 2 or 3, wherein the moisture-resistant barrier is made of sheet material.

5. A catamenial tampon as claimed in Claim 4, wherein the moisture-resistant barrier is made of fabric.

6. The method of making an absorbent catamenial tampon for insertion into a human vagina for absorption of body fluid therein, which consists in providing a substantially rectangular bar of absorbent fibres, covering one end of said bar with a piece of moisture-resistant sheet material, uniting said fibres and sheet material with a row of stitching axially along said bar and through said sheet material, subjecting said stitched bar and sheet material to compression in a substantially cylindrical mold effecting compression of said fibres in said bar and closing the open side edges of said sheet material to form a substantially continuous moisture-resistant barrier around one end of said compressed tampon.

7. The method as claimed in Claim 6, wherein the ends of the threads effecting said stitching extend beyond said covered end of

the bat to form a cord for withdrawing the tampon from the vagina after use.

8. The method of making an absorbent catamenial tampon, substantially as hereinbefore described with reference to the accompanying drawing.

9. Catamenial tampons constructed substantially as hereinbefore described with reference to the accompanying drawing.

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871689 COMPLETE SPECIFICATION
1 SHEET *This drawing is a reproduction of the Original on a reduced scale*

FIG. 1.

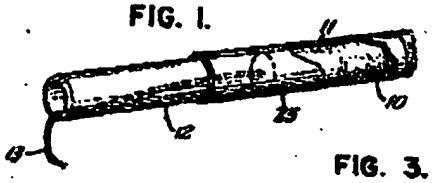

FIG. 2.

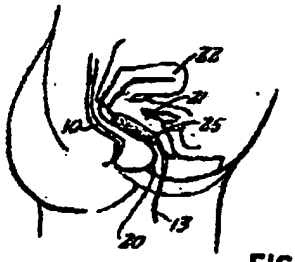

FIG. 3.

FIG. 4.

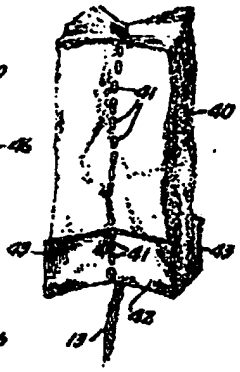

FIG. 5.

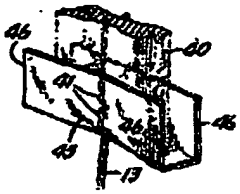

FIG. 6.

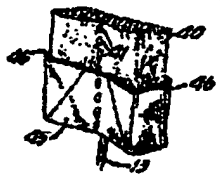

FIG. 7.